International Consensus Guidelines for Public Health Decision Making During Wildfire Smoke Events

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Acknowledgements

- British Columbia Centers for Disease Control and Prevention Project Team
- Scientific Advisory Committee
- Expert Reviewers

Overview

- Health surveillance for wildfire smoke
- Wildfire Smoke Surveillance
- Masks
- Clean air shelters
- Filtration
- Evacuation

Some uses of health surveillance for wildfire smoke

- Early warning system of important health impacts during wildfire events
- Estimate health burden of event
- Help locate vulnerable populations
- Use in forecasting magnitude of future events based on past relationships
- Evaluating efficacy of interventions
- Evaluate preparedness

Ad hoc surveillance where not system is in place

Access and Monitoring of available healthcare utilization data (e.g. physician/ER visits, hospitalizations, meds, all-cause mortality) on respiratory outcomes (asthma, COPD, other respiratory)

- Role of active surveillance (record review, pharmacy contact, etc.)

Current Best Practice for setting up surveillance prior to wildfire event

- Analyze excursions from expected daily counts from historical baseline of health events or med use using developed algorithms
- Use of electronic health records, physician, hosp, ER visits
- Data and syndrome definitions need to be established

Current Best Practice

- Baseline (historic) data and demographic characteristics of regions need to be established
- Are hospitals that participate representative?
- Could utilize other existing surveillance systems
- Can analyze respiratory syndromes, all cause morbidity/mortality, or more focused health outcome


October 2007 San Diego Fires
100’s of thousand of acres burned
300,000 evacuated

Biosense Southern California Wildfire report

(San Diego hospitals data only shown)

- Respiratory syndrome 8-36% daily increase over 7 day baseline
- Asthma 150-615% increase in hospital admissions
- Burns- 3-9 visits/day
- Cardiac dysrhythmias – 5-6 visits/day
- Total visits 16-85% increase in admissions, 16-40% increase in ED visits

BC Asthma Medication Surveillance (BCAMS)

- Near real-time surveillance of exposure and health outcomes
  - Measured, modeled, and forecasted PM2.5 levels
  - Daily dispensations of salbutamol sulfate
  - Excursions from daily expected number using algorithms
  - Physician visits being integrated

Wildfire Smoke Surveillance

- Air quality monitors, remote sensing products, retrospective and forecasting modeling, and fire smoke proxies (no gold standard).
- Visibility range is a good proxy for smoke levels :minimal expertise; recommended in existing public health guidelines for communities without monitors.

Wildfire Smoke Surveillance (cont)

- Forecasting models can provide prospective information, but have uncertainties in model performance.
- Remote sensing and retrospective modeling have been developed: have potential for monitoring smoke from long-ranged transportation and improving the spatial resolution of existing monitoring networks.

Masks

- No single respirator can protect against all gases and vapors found in wildfire smoke.
- Filtering half facepiece respirators (FHFR) such as N95 masks provide effective protection against PM. Can reduce exposure 10 fold w/ proper fit.
- Very limited evidence on the use of respirators as an individual-level mitigation approach during wildfire smoke events

Clean Air Shelters

- Few studies have evaluated the use of air filters during wildfire smoke events.
- Use of high efficiency particulate air (HEPA) filters and electrostatic precipitators has been shown to reduce residential PM2.5. Effectiveness varies depending on room size, air exchange rate, as well as pollution sources in homes

Clean Air Shelters (cont)

- Some evidence suggests that use of portable HEPA air cleaners, even over the short term (days), may be linked to improvements in cardiovascular health and some asthma-related symptoms
- Filtration is a potentially effective intervention to reduce PM2.5 exposures through the establishment of home clean air shelters or community clean air shelters

Filtration in Institutions

- Hazardous conditions for both workers and vulnerable patient populations in hospitals and other institutional settings
- Effectiveness of existing filtration system may be enhanced with the use of pre-filters or higher Minimum Efficiency Reporting Value MERV rated filters, more frequent change-out as well as portable air cleaning devices equipped with HEPA filters.

Filtration in Institutions (cont)

- In US health care settings, filters with a MERV rating between 8 and 15 are required for normal operating conditions.
- In locations where frequent wildfire episodes are likely the State of California recommends that a filter with a rating of MERV 17 be used

Evacuation

- Evacuation decisions should be based on clear public health objectives and be designed to optimize health protection and minimize harms.
- Some evidence of the potential harms of evacuation (e.g. increased illness, mental health)

Evacuation (cont)

- Providing portable HEPA filters was more effective than evacuation at reducing respiratory symptoms among those with a history of cardiopulmonary illness (one evaluation study)
- Wildfire smoke response guidelines that consider evacuation to protect from smoke (rather than fire) exposure recommend it only for those who are vulnerable rather than for entire populations.

Conclusions

- Health outcome surveillance for wildfires is improving and should move toward best practices
- Smoke surveillance is improving, but no gold standard
- Limited evaluation studies showing efficacy of interventions; however, interventions likely to reduce exposure

Evidence Review Team

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http://www.bccdc.ca/healthenv/AirQuality/default.htm?wbc_purpose=Basic